

Date: Friday, 02/05/2008 9:13:59 AM
 User: Julie Lecocq

Process Sheet

Customer : CU-DAR001 Dart Helicopters Services	Drawing Name : HIGH AFT X-TUBE 412
Job Number : 38965	
Estimate Number : 10559	
P.O. Number :	
This Issue : 02/05/2008 S.O. No. :	Part Number : D412664203
Prsht Rev. : NC	Drawing Number : D412-664-243 REV D
First Issue : 01/05/2008 Type : CROSSTUBES	Project Number : N/A
Previous Run : 38964	Drawing Revision : D
	Material :
Written By :	Due Date : 15/05/2008 Qty: 1 Um: Each
Checked & Approved By : <u>JLD 08.5.02</u>	
Comment : Est Rev:E 04.02.16 Reformat; Added D3189-1 K/DS Est Rev:F 06-03-29 Remove Coments on Pick List JLM Est Rev:G 06.12.08 per ECN 886 EC Est Rev:H 07-04-30 As per Rev D JLM	

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
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1.0	DC	DOCUMENT CONTROL
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**Comment:** DOCUMENT CONTROL

Photocopy bluefile and create labels as per PPP D412-664-203 CHG 006

08/06/07 08.5.05 JLD

2.0	PACKAGING 1	PACKAGING RESOURCE #1
-----	-------------	-----------------------

**Comment:** PACKAGING RESOURCE #1

3.0	D412664203TRN	CROSSTUBE TURNING DETAIL
-----	---------------	--------------------------

**Comment:** Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

CROSSTUBE TURNING DETAIL

batch B39024Q 8-6-4

4.0	BENDING	BENDING MACHINE - SKIDTUBES
-----	---------	-----------------------------

**Comment:** BENDING MACHINE

Bend tube as per Dwg D412-664-243 using CNC bender program 412-af and Folio FT010

Q 8-6-4

5.0	QC15	DIMENSIONAL CHECK OF X-TUBES
-----	------	------------------------------

**Comment:** DIMENSIONAL CHECK OF X-TUBES

08-06-04 11

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Friday, 02/05/2008 9:13:59 AM
User: Julie Lecocq

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: HIGH AFT X-TUBE 412

Job Number: 38965

Part Number: D412664203

Job Number:



Seq. #:

Machine Or Operation:

Description:

6.0

CROSSTUBES

CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551

2-Ream hole to finish size in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243

AWM
8-6-4

AWM
8-6-5

7.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

AWM
8-6-5

8.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

9.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

10.0

OUTSIDE SERV.10

OUTSIDE SERVICES -skids



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 038 Or

Issue P/O: 6525 LPI as per ASTM 1417

Level 2 Attach copy of NDT results to work order

CLO 8/06/09 ①

11.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage

Ensure copy of NDT results attached to work order.

P. J. P. ①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

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User: Julie Lecocq

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: HIGH AFT X-TUBE 412

Job Number: 38965

Part Number: D412664203

Job Number:



Seq. #:

Machine Or Operation:

Description :

12.0

QC5

INSPECT WORK TO CURRENT STEP



ml 08 06 10



①

Comment: Inspect for damage & ensure results are as per Dwg D412-664-203

13.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

ml 08 06 12

①

14.0

QC14

INSPECT SPRAY PAINT



Comment: Inspect Spray Paint

Wrap in plastic bag to protect from scratches

75 08-06-13

15.0

D3595063570

RUBBER CUSHION



Comment: Qty.: 4.0000 Each(s)/Unit Total: 4.0000 Each(s)

Rubber Cushion

Batch: 35126

ml 08 06 16

16.0

D2856600

Abrasion Strip



Comment: Qty.: 1.7640 f(s)/Unit Total: 1.7640 f(s)

Pick:

Qty Part number Description Batch

2 D2856-600(Cut to 10.090") Abrasion Strip 36398

ml 08 06 16

17.0

D28961

Support



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D2896-1 Support 33471

ml 08 06 16

18.0

D31891

Chafing Shield



Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s)

Pick:

Qty Part number Description Batch

2 D3189-1 Chafing Shield 37884

ml 08 06 16

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

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Date: Friday, 02/05/2008 9:13:59 AM
User: Julie Lecocq

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: HIGH AFT X-TUBE 412

Job Number: 38965

Part Number: D412664203

Job Number:



Seq. #:

Machine Or Operation:

Description :

19.0

MS2192028

Clamp(per MIL-DTL-8783C)



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:

Qty Part number Description Batch

4 MS21920-28 Clamp 107502

ml 08 06 16

20.0

MS2192030

clamp(per MIL-DTL-8783C)



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

clamp(per MIL-DTL-8783C)

batch: 106810

AM 08 06 16

21.0

CROSSTUBES

CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

Assemble as per Dwg D412-664-203

1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

ml 08 06 16 (1)

2-Install supports with magnobond as per QSI 015 Adhere for for 12 Hrs

A/R 6398 Magnobond

Batch: 107621

Expiry Date: 08/2009

Time: 11:45

3-Install clamps as per Dwg D212-664-141. Torque clamps to 80-100 in lb.

ml 08 06 17 (1)

22.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

08 06 17 (1)

23.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick Packing Kit

24.0

AN640A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Bolt

Batch: M107376

AS 08/06/17 (X1)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

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User: Julie Lecocq

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: HIGH AFT X-TUBE 412

Job Number: 38965

Part Number: D412664203

Job Number:



Seq. #:

Machine Or Operation:

Description :

25.0

AN641A

Bolt



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Bolt

Batch: M107013

JS 08/06/17 (XL)

26.0

AN960JD616

Washer



Comment: Qty.: 18.0000 Each(s)/Unit Total : 18.0000 Each(s)

Washer

Batch: M107242

JS 08/06/17 (XL)

27.0

MS21042L6

Nut



Comment: Qty.: 6.0000 Each(s)/Unit Total : 6.0000 Each(s)

Nut

Batch: M105077

JS 08/06/17 (XL)

28.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

JS 08/06/17 (XL)

29.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D412-664-203

*****Ensure tube is not packaged if curing time is less than 12 hrs, see step 27 for application time & date

Time & date of packaging: 08/06/17 1:00pm.

Location:

PPP Rev:

Rev G

JS 08/06/17 (XL)

30.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

08/06/17

Job Completion



558165 D412-664-203

08/06/18

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

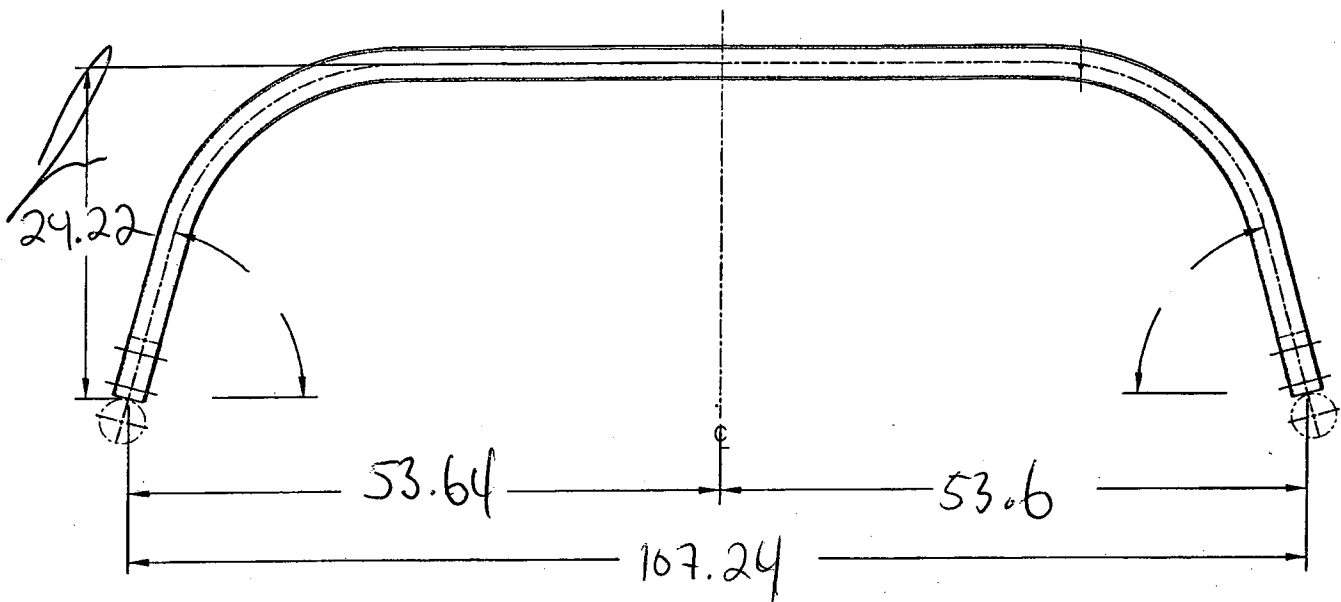
QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order: 38965
Description: Crosstube High Aft (412)		Part Number: D412-664-203
Inspection Dwg: D412-664-243 Rev: D		Page 1 of 1

Required Dimension	Min	Max
Height	24.24	24.50
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.70



Comments

QC15 Inspection	10806.04
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.08	Dimensions updated per Dwg rev. D	KJ/JLM	

DART**RELEASE**

07.04.24

DESIGN PH	DRAWN BY PH	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED GP	APPROVED [Signature]	DRAWING NO. D412-664-243	REV. D SHEET 1 OF 3
DATE 07.03.09		TITLE CROSSTUBE ASSEMBLY (412 HI AFT)	SCALE NTS
A	01.10.17	NEW ISSUE	
B	05.02.04	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	
C	06.10.27	REMOVE D2856-600-1087, ADD D2732-058 & MAGNOBOND 6398 MS21920-32 WAS MS21920-30	
D	07.03.09	REMOVE D2732-058, CHANGE TO D3595-063-570	

Qty	Part Number	Description
X	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
1	D6009-129	CROSSTUBE
2	D3595-063-570	RUBBER CUSHION
1	D2896-1	SUPPORT
2	D2856-600-1009	ABRASION STRIP
4	MS21920-28	CLAMP
2	MS21920-30	CLAMP (OR MS21920-32)
2	D3189-1	CHAFING SHIELD
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

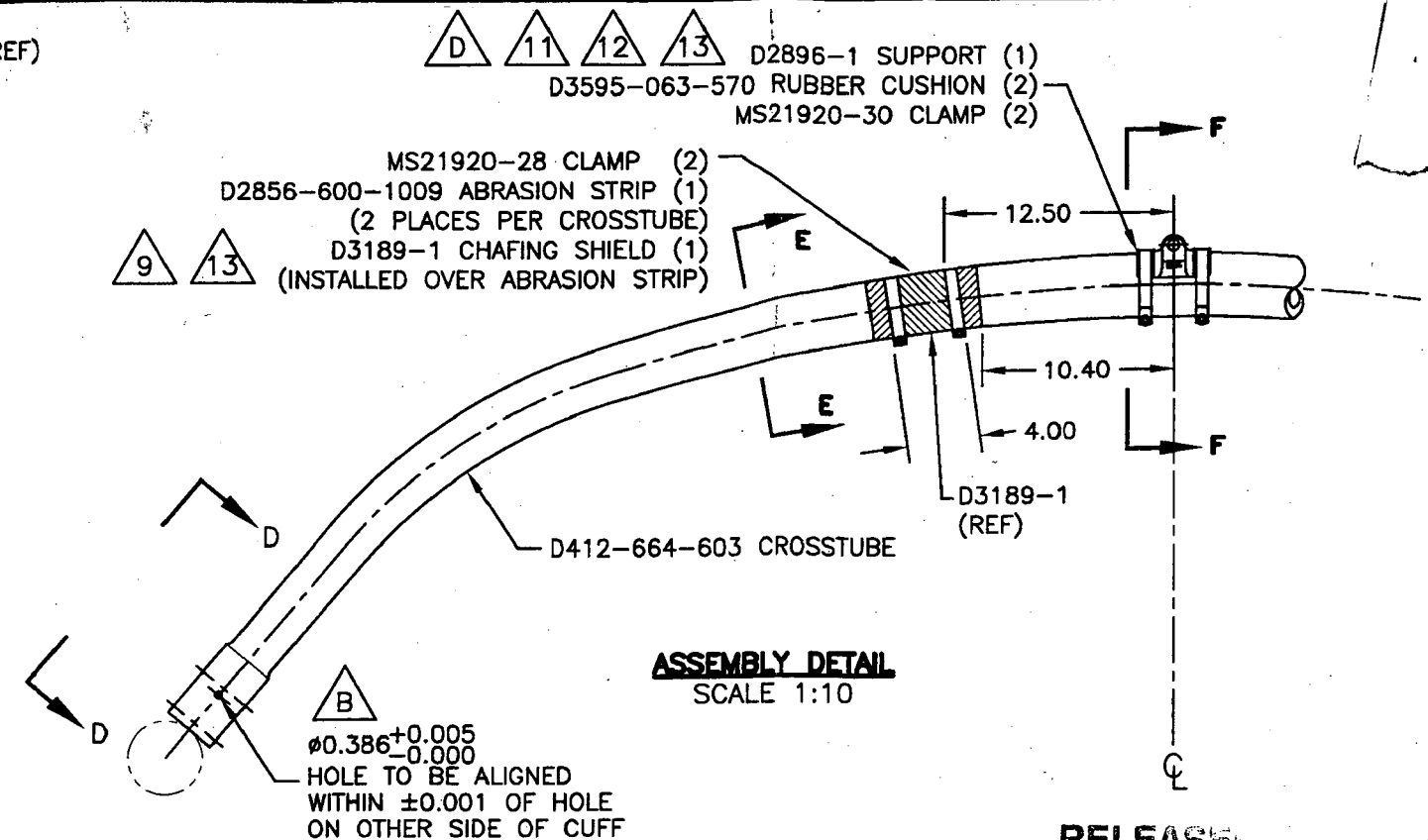
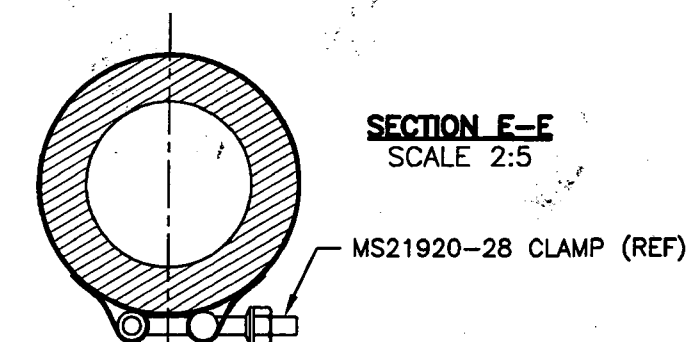
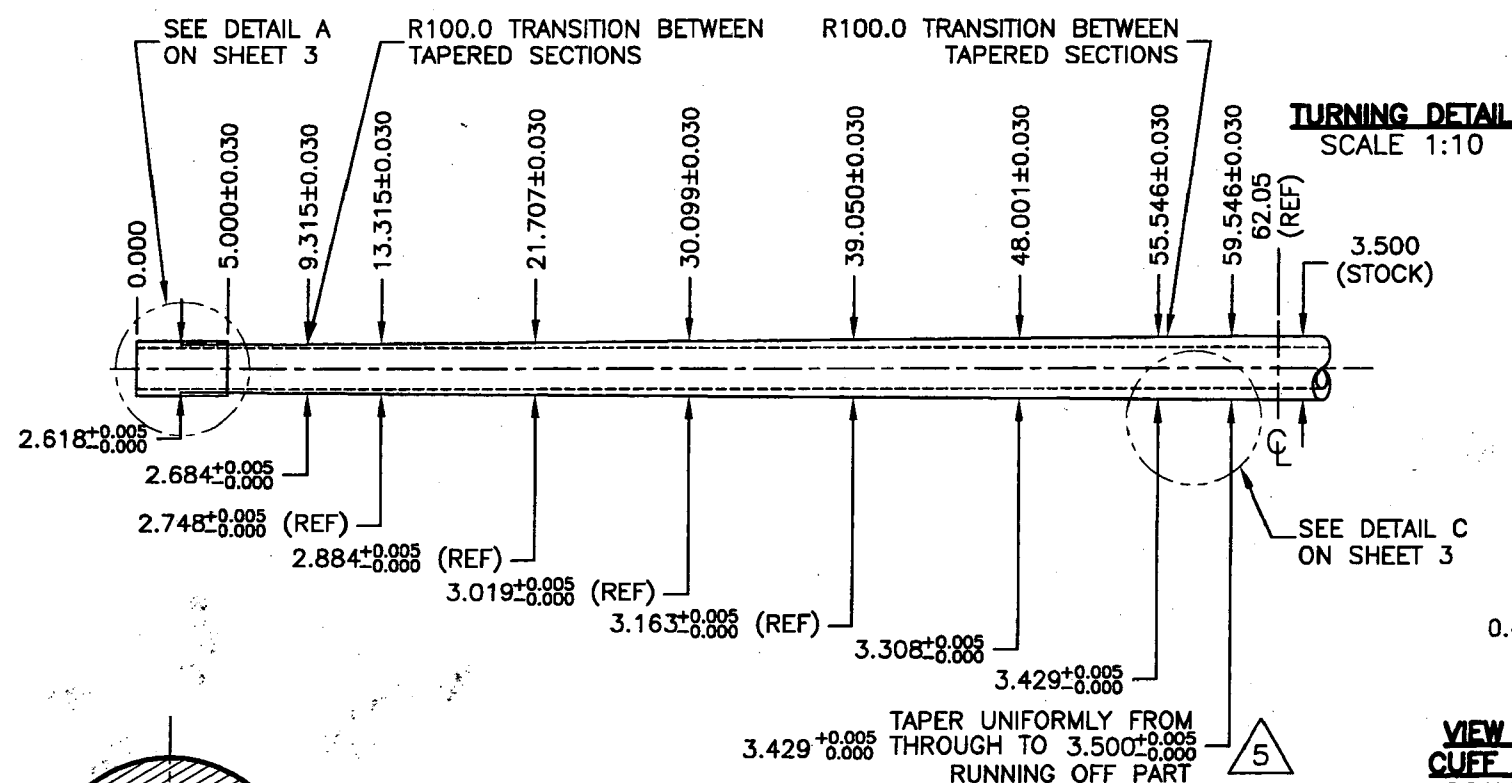
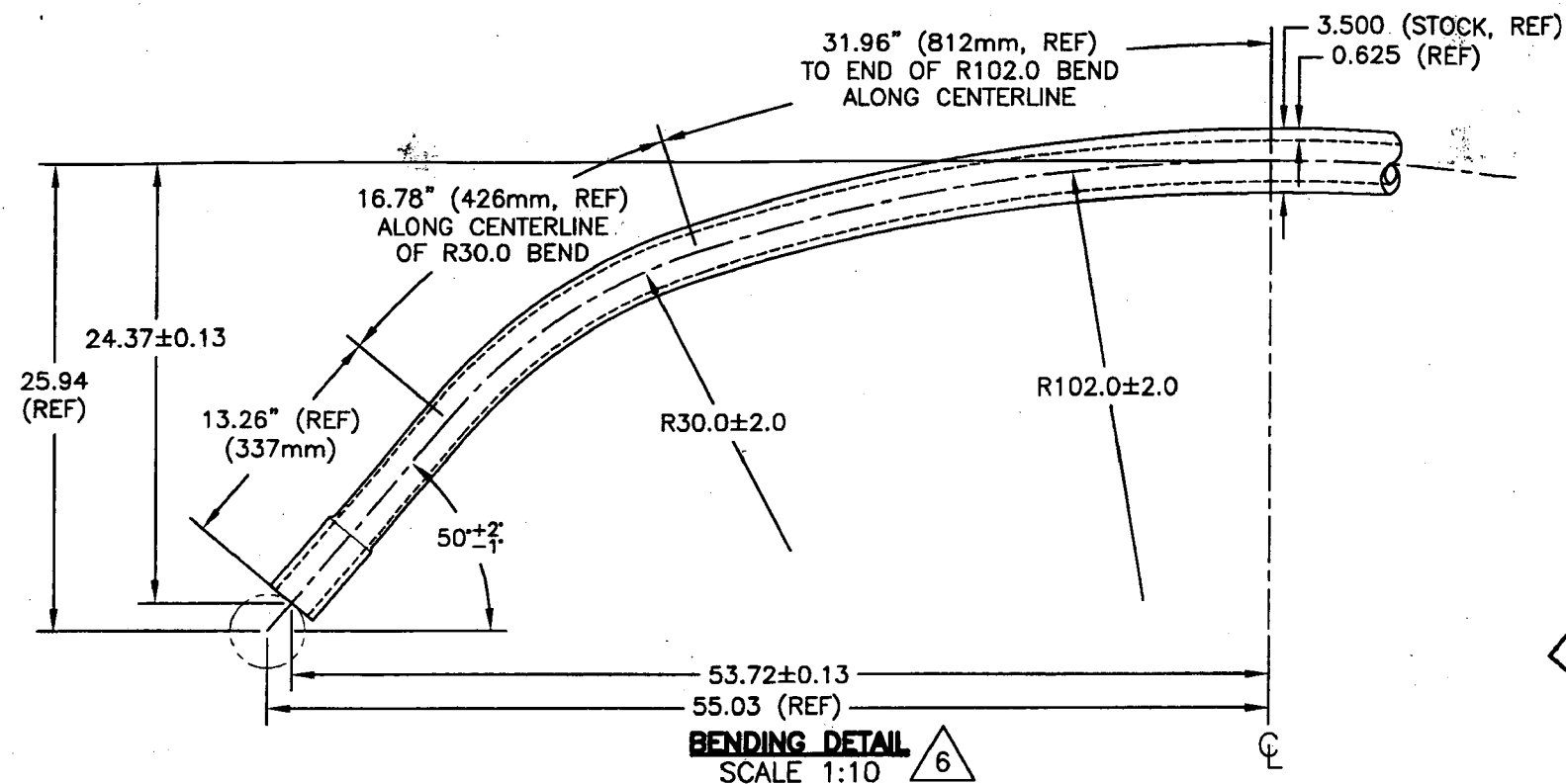
GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6009-129
FINISHED LENGTH = 124.09±0.020
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2856-600-1009 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

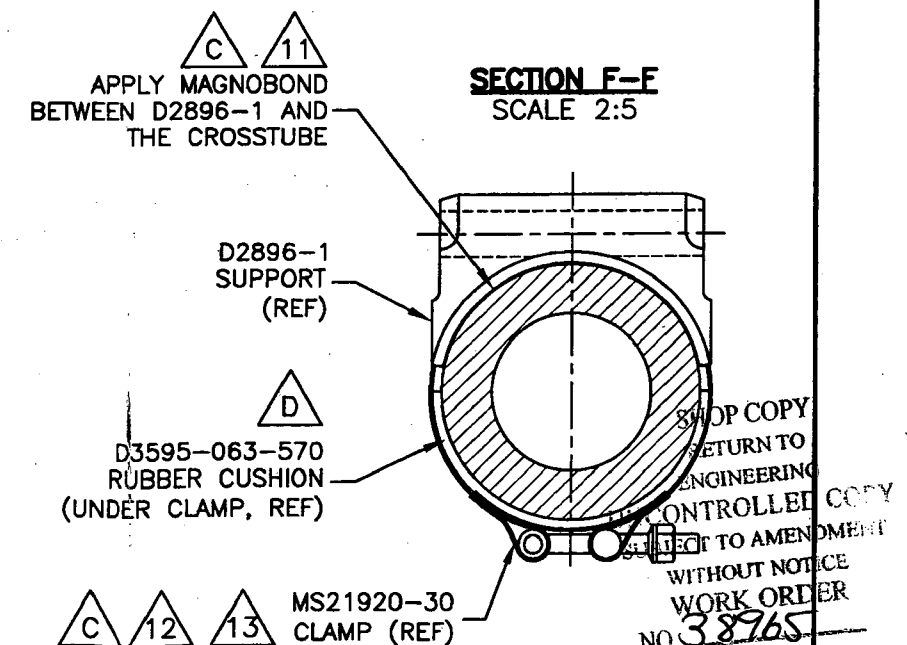
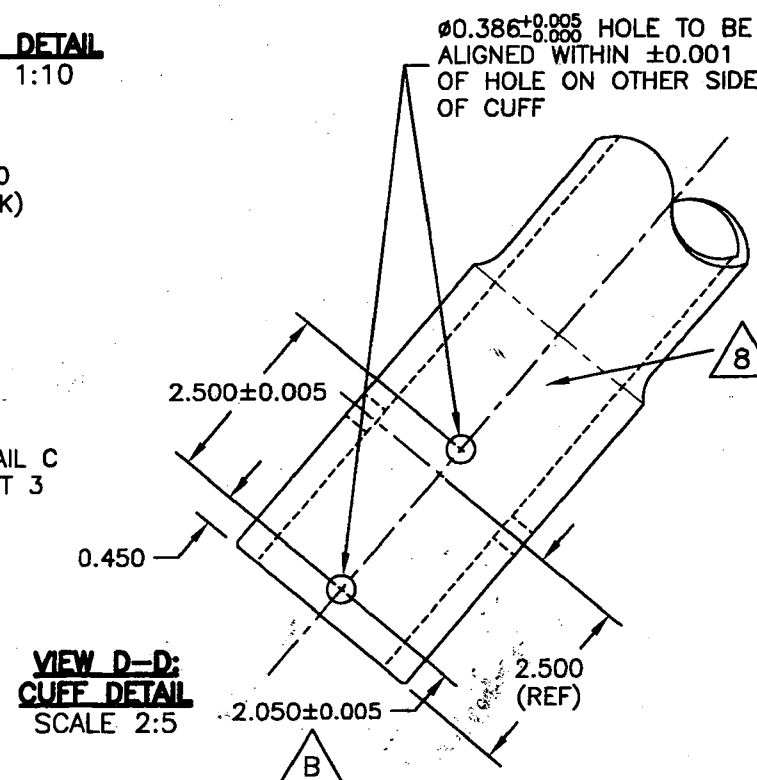
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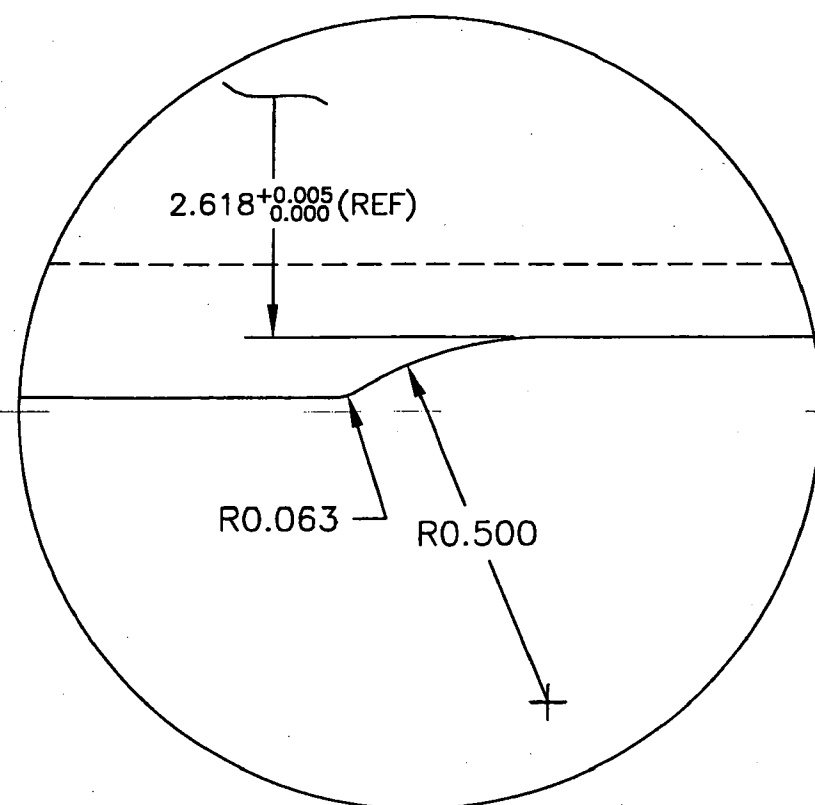
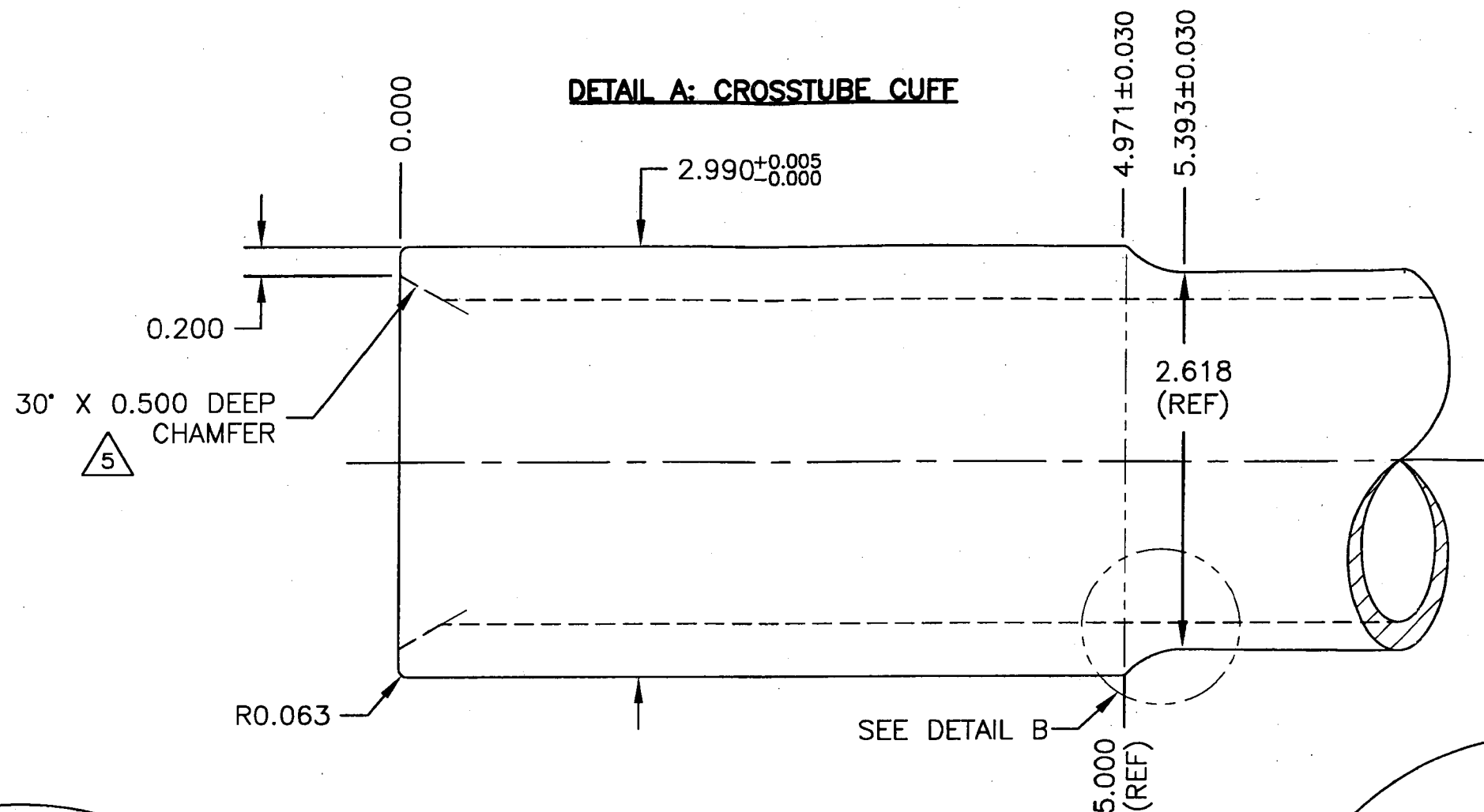


RELEASE
07.04.24



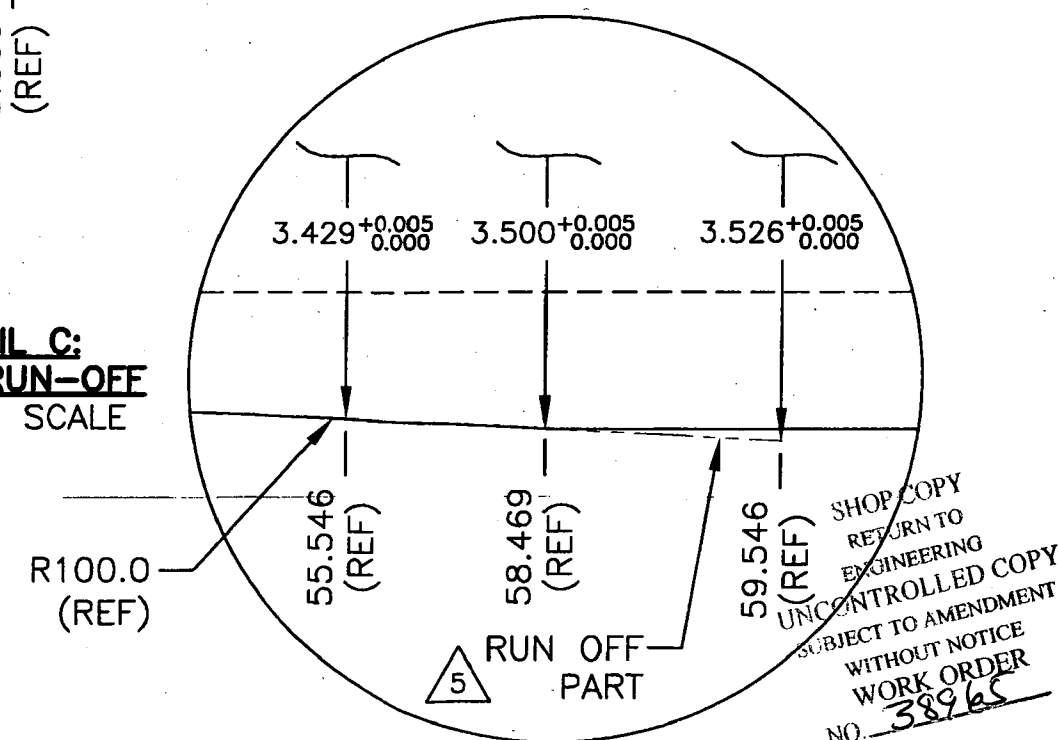
COPYRIGHT © 2001 BY DART AEROSPACE LTD.		DESIGN	PH	DRAWN BY	PH	DART	DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.		CHECKED	GP	APPROVED	PH	DRAWING NO. D412-664-243	REV. D SHEET 2 OF 3
		DATE	07.03.09	TITLE		CROSSTUBE ASSEMBLY (412 HI AFT)	SCALE 1:10

RELEASED
07.04.244
PER ECN 389



**DETAIL B: CUFF
TRANSITION**
SCALE 4:1

**DETAIL C:
TAPER RUN-OFF**
NOT TO SCALE



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DART AEROSPACE LTD.

DESIGN PH
DRAWN BY PH
CHECKED J
APPROVED J
DATE 07.03.09

DART DART AEROSPACE LTD.
HAMKESBURY, ONTARIO, CANADA
DRAWING NO. D412-664-243
REV. D
SHEET 3 OF 3
TITLE CROSSTUBE ASSEMBLY (412 HI AFT)
SCALE 1:1

**ACUREN****LIQUID PENETRANT TEST REPORT**

P- 09176

PAGE 1 OF 1

CLIENT DART AEROSPACE DATE JUNE 09 2008 TIME AM ☒ PM ☐

ATTENTION LINDA LACELLE ACUREN JOB NO. 188-08-1354

ADDRESS 1270 ABERDEEN ST. PO/WO No. 6525

HAWKESBURY, ON WORK LOCATION HAWKESBURY

PROJECT 3 x 203, 2x 101 ACCEPTANCE STD. ASIM 1417/CSI-038 REV./DATE 2005

ITEM(S) EXAMINED 203-39579, 39580 (38965)

101-39274, 39273

JOB DESCRIPTION PROCEDURE No. LT 0002 REV./DATE TECHNIQUE No. LT TECH 2 REV./DATE

PART NO. 3 pcs D412664203 MATERIAL ALODINED ALUM. THICKNESS

SCOPE 2 pcs D212664101

SCOPE WET FLOURESCENT LIQUID PENETRANT INSPECTION 100% EXTERNAL SURFACE

TEST DETAILS

METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED

FAMILY BRAND BLACK LIGHT S/N 8171 ☐ OUTPUT > 1000 μ W/cm² ☐ AMBIENT < 2 fc

PENETRANT MINIMUM DWELL TIME 40-45 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE

PENETRANT REMOVER H2O MINIMUM DRY TIME >10 MIN. OTHER CAL FEB 12 2008

DEVELOPER SKD 20 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N CAL DUE DATE

DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

TEST SURFACE

SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☐ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL

SURFACE TEMPERATURE ☐ < - 4°C/ 20°F ☐ - 4°C/ 20°F TO 10°C/50°F ☐ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- (☐ METRIC ☒ IMPERIAL)

ITEM	COMMENTS	ACCEPT	REJECT
	FLUORESCENT LIQUID PENE. INSP.		
	CARRIED OUT ON 100% OF		
	EXTERNAL SURFACE ONLY		
3 pcs 203	JOB# 39579, 39580 (38965)		
2 pcs 101	JOB# 39273, 39274		

RESULTS NO INDICATIONS OF DEFECTS

ITEMS ACCEPTABLE TO STANDARD

Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE [Signature] DTR #

TECHNICIAN (SIGNATURE): [Signature] REPORT REVIEWED BY:

NAME (PRINT): J BILMER NAME INITIALS

1ST TECHNICIAN 2ND TECHNICIAN

CGSB LEVEL 2 SNT LEVEL CGSB LEVEL SNT LEVEL

CGSB REG. No 9901 CGSB REG. No